Spring 2019

CE 332-104: Structural Analysis

Ala Saadeghvaziri

CE 332 – Structural Analysis Section: 002 & 104	Spring 2019
Texts:	Hibbeler, Russell C., Structural Analysis, 10th Edition, Prentice Hall ISBN: 978033942842
Instructor:	Dr. M. Ala Saadeghvaziri, Room 216 Colton Hall, Tel: 973-596-5813, ala@njit.edu ; Office hours: TBD later; other times by appointment.

Prerequisites: *MECH 237 with a grade of C or better. A working knowledge of free body diagrams, equilibrium conditions for force systems and moments. The primary objective is an understanding of the various methods of analyzing determinate and indeterminate beams, frames, and trusses encountered in*

Week	Topics	Chapter	Homework Problems
1	Introduction, Stability and Classification of Structural Behavior	1, 2	Assigned in class.
2, 3	Analysis of Determinate Beams and Frames	4	
4, 5	Influence lines, Moving Loads, Shear and Moment Envelops	6	
6	Review, Test I		
7	Introduction to Approximate Analysis of Structures	7 – This will be mostly self-study. Complemented with a computer-based project.	
8	Deflection of Trusses: Virtual Work Method (Unit Load Method)	3, 8, 9	
9, 10	Deflections: Moment area, and integration methods	8, 9	
11	Review, Test II		
12	Indeterminate Structures: Consistent Deformation Method	10	
13	Indeterminate Structures: Slope Deflection Method	11	
14	Indeterminate Structures: Moment Distribution Method	12	
15	FINAL EXAM		

Homework and computer project will be assigned by the instructor.

GENERAL INFORMATION

Homework problems will be assigned by the instructor. Also, the students are encouraged to solve many additional problems in the text book. During the term, each student is required to complete the following requirements in addition to the requirements previously mentioned.

1. Self-study approximate analysis methods (Chapter 7)
2. Use Robot (or program of your choice) to analyze a frame (to be assigned). Basic training on Robot will be provided.

The final grade will be arrived at on the following basis.

Tests (TBD – around 5^{th} and 10^{th} week)	40 Points
Final Exam (15th week)	35 Points
Homework	10 Points
Computer Project	15 Points
TOTAL	100 Points

*The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.

*Students will be notified well in advance should there be any modifications or deviations from the syllabus throughout the course of the semester.

*No makeup will be given. Under legitimate, documented and extenuating circumstances the grade for the final exam will be used for missed test.

Outcomes Course Matrix – CE 332 Structural Analysis

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Provide the ability to understand the behavior of structures under different loading conditions.			
Illustrate basic structural applications and static analysis.	1	1	Weekly homework and quizzes.
Discuss the design of structures.	1	1, 2	Weekly homework and quizzes.
Student Learning Outcome 2: Apply the principles and equations for the analysis of statically determinate and indeterminate analysis in preparation for subsequent design courses.			
Develop various methods of analysis.	1	1, 2	Weekly homework and quizzes.
Provide distinct and detailed examples of how these methods are utilized.	1, 2	1, 2	Weekly homework and quizzes.
Student Learning Outcome 3: Use structural analysis/design software.			
Discuss software tools.	3	1	Lab report.
Analyze assignments using software tools.	1, 7	1	Review of analysis problems.

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our program educational objectives are reflected in the achievements of our recent alumni:

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Alumni will advance their skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 9/2/18